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Proceedings of the Regional Peer Review Assessment of Herring Stocks in the North Shore of Quebec (4S) in 2016

April 12, 2017
Mont-Joli, Quebec

Chairperson: Charley Cyr
Rapporteur: Sonia Dubé

Maurice Lamontagne Institute
Fisheries and Oceans Canada
850 Route de la Mer, P.O. Box 1000
Mont-Joli, Quebec G5H 3Z4

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Canada

Foreword

The purpose of these proceedings is to document the key activities and discussions that took place during the meeting. The proceedings may include research recommendations, uncertainties and the rationale for decisions made during the meeting. They may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. Therefore, interpretations and opinions presented in this report may be factually incorrect or misleading, but are included to record, as faithfully as possible, what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review of the issue may result in a change in conclusions, particularly if additional relevant information not available during the meeting is provided afterward. Finally, in rare cases where dissenting views are officially expressed, they are also documented in the appendices to the proceedings.

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SUMMARY

This document contains the proceeding from the meeting held within the regional assessment of the 4S herring stocks. This review process was held on April 12, 2017 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered about thirty participants from sciences, management and industry. This proceeding contains the essential parts of the presentations and discussions held and relates the recommendations and conclusions that were presented during the review.

SOMMAIRE

Ce document renferme le compte rendu de l'examen régional par des pairs portant sur l'évaluation des stocks de hareng de la Côte-Nord du Québec (4S). Cette revue, qui s'est déroulée le 12 avril 2017 à l'Institut Maurice-Lamontagne à Mont-Joli, a réuni près d'une trentaine de participants des sciences, de la gestion et de l'industrie. Ce compte rendu contient l'essentiel des présentations et des discussions qui ont eu lieu pendant la réunion et fait état des recommandations et conclusions émises au moment de la revue.

INTRODUCTION

The Quebec Region of Fisheries and Oceans Canada (DFO) is responsible for assessing several stocks of fish and invertebrate species harvested in the Estuary and Gulf of St. Lawrence. Most of these stocks are periodically assessed as part of a regional advisory process conducted at the Maurice Lamontagne Institute in Mont-Joli. This document consists of the proceedings of the meeting held on April 12, 2017, on the assessment of the North Shore of Quebec (4S) herring stocks.

The objective of the review was to determine whether there are any changes in the resource's status and whether management plans need to be adjusted based on the chosen conservation approach, the ultimate goal being to formulate a Science Advisory Report on the management of herring stocks in Quebec's North Shore (4S) for the 2017–2018 fishing seasons.

These proceedings report on the main points of the presentations and deliberations that arise from the regional stock assessment committee's activities. The regional review is a process open to all participants who are able to provide a critical outlook on the status of the assessed resources. Accordingly, participants from outside DFO are invited to take part in the committee's activities within the defined terms of reference for this review (Appendices 1 and 2). The proceedings also list the recommendations made by meeting participants.

CONTEXT

Meeting chairperson Charley Cyr welcomes the participants. He goes over the peer review objectives and agenda. The participants introduced themselves. The biologist in charge of the review, Kim Émond, highlights the work of her collaborators and presents the outline of the meeting. Ms. Émond provides some information on the biology of the species and commercial fishing, then briefly reviews the highlights of the last Science Advisory Report (2011).

ASSESSMENT OF THE RESOURCE

LANDINGS

The biologist presents landing statistics by unit area, fishing gear, landing date, and fishing position. Herring landings on the North Shore of Quebec have significantly increased since 2011, reaching the TAC of 4,000t. In 2016, preliminary landings were 4,022t. Unlike the previous 2011 period dominated by fixed gear fishery in the western part of the area, the majority of landings are now from the purse seine fishery practised in unit area 4Sw.

- Landings are becoming increasingly more concentrated in time, possibly as a result of fishing gear efficiency.
- According to participants, the introduction of a very effective purse seine fishery would explain the increase in catch since 2011. The 2011 Science Advisory Report could likely have contributed to this increase.
- Landings are also spatially concentrated (4Sw) because of the proximity of markets (facility) and the herring concentration in this sub-area.
- It is specified that fishers in 4Sw are exclusively from Quebec. There would be no fisher from Newfoundland.

BIOLOGICAL DATA

Catches-at-age and key biological indicators are presented for both stocks. Spring and fall herring spawner catches are currently dominated by fish aged 10 years and older. No significant recruitment has been observed since 2005 in both spawning stocks.

- Participants regret that the dockside sampling data are not used because they do not differentiate the two spawning stocks. It is suggested that the fishing period may be matched with a particular stock. Fish captured before June 30 can be assumed, for example, to be spring spawners. Consideration on this topic is required in order to use these data.
- With regards to length frequencies by fishing gear, an inconsistency is noted between the spring and fall spawners. Fishing gear change would have had very little effect on the sizes of fall spawners captured, which is not the case for spring spawners.
- In terms of length at age and somatic weight for fish aged 4 to 6 years, the decline observed since 1983 appears to have stabilized in recent years. Given that exploitation has intensified, the effect of density dependence is possibly less significant. Moreover, the fishery shifted from west to east and has been more concentrated in the summer these past few years. However, because of the small sample size, some caution is required in interpreting these results.
- Considering the significant change made in this fishery (spatial, temporal, fishing gear), it is suggested to think of an approach that will allow weight the data according to these changes.
- It is also proposed to compare the data, particularly for maturity at length, to environmental changes.

MULTIDISCIPLINARY SURVEY CATCHES

The biologist provides a brief presentation of the information on herring catches in multidisciplinary surveys, including a dispersion index from the Teleost survey and distribution maps of herring catches in the July mobile gear sentinel surveys.

- Sentinel fishery distribution maps are considered poor representations because they do not cover eastern 4S.
- Participants also question the accuracy of the Teleost survey dispersion index. According to them, this index does not fully cover herring dispersion. It is but a small sample with no distinction of the two stocks or sizes. Other participants are of the opinion that this survey nonetheless signals the presence of herring in the northern Gulf.
- Participants decide to keep this index for the assessment, but to not include it in the summary advisory report.
- It is also suggested that the accuracy of this index be discussed at the next input meeting, along with other pelagic species.

ACOUSTIC SURVEYS

A first acoustic survey, which covers the entire 4S coastal area, was conducted in fall 2016. The estimated total biomass for spring spawners is estimated at 830t and 21,477t for fall spawners. Five acoustic surveys were conducted between 2009 and 2016 in unit area 4Sw located in the eastern part of the Lower North Shore of Quebec. The stock biomass index for spring and fall spawners in unit area 4Sw has dropped significantly since 2010.

- It is pointed out that the 2016 survey is the first acoustic survey to cover the entire 4S coastal area.
- There are questions about the suitability of conducting this survey earlier in the year. However, a fall survey allows to sample the two stocks when they regroup near the coasts and gives an overview of the situation after the fishing season (a post-season survey) and before the winter migration.
- Some ongoing research work on herring dispersion during other periods of the year is mentioned.
- As for the choice of strata for the acoustic survey, it is important to ensure the fishing pattern is adequately represented. It is also recommended to draw on the experience of fishers to obtain better coverage near the shore.
- There are questions about the possible exchange between 4S and 4R herring, which will be considered in the section of future research work.
- The decline in the 4S biomass index must be properly interpreted by the industry. This downward trend applies to 4Sw sub-area only. It is agreed that fishing effort is too concentrated in this sub-area. Dispersal of fishing effort along the coast is encouraged.
- Biomass index for each stock (spring and fall) was estimated based on the proportion of both stocks in fishery landings. However, the possibility of regrouping the two stocks to have a total biomass index is under consideration.
- Participants are concerned about the herring stock status because of both the drop in the biomass index in 4Sw and the absence of recruitment according to the catch-at-age examination.
- Regarding sources of uncertainty, it is strongly advised to increase commercial and acoustic sampling.

CONCLUSION

INTERIM YEAR

The next assessment is scheduled for winter 2019, with no update until then. The next 4S acoustic survey will be conducted fall 2018.

- It was suggested that the 4R survey covers area 4Sw, which would then be sampled every year.

FUTURE RESEARCH WORK

The purpose of the work deemed a priority by the meeting is to:

- Continue the acoustic survey, while refining this survey;
- Improve commercial and acoustic sampling (more sampling, better dispersion);
- Improve the agreement of age estimation between otolith readers, especially for ages ≥ 9 (workshop in 2018);
- Determine the causes of the spring spawning herring's near disappearance:
    - Spring vs. fall classification: update gonads maturation calendar;
    - Change of spring herring into fall herring;

- Effects of environmental changes.

- Examine potential exchange between 4R and 4S herring, via otolith assessment for example;
- Investigate the possibility of developing a gillnet survey in 4S, as is the case for 4T.

HIGHLIGHTS AND RECOMMENDATIONS

The highlights are presented and the participants comment on them. Comments having to do with stylistic rewording are not reported.

- In the catch composition highlights, it is mentioned that these catches are made up of fish aged 10 years and older. It must also be stated that no significant recruitment has been observed since 2005 in both spawning stocks. No mention of the 2013 age class will be made in the summary.
- It is proposed to add a highlight referring to the change in the primary type of gear used for this fishery (fixed gear versus purse seine).
- It should also be noted that landings in the western part of the area were dependant on fixed gear.
- The highlight on length and age at 50% maturity was removed. The information will be kept in the Report.
- In the highlights on the 2016 acoustic survey, it is important to specify that the 2016 acoustic survey covers the entire 4S coastal area.
- As for the biomass index, meeting participants agree that there was a "sharp" drop.
- Discussion took place regarding the wording of the recommendation. Participants agree on the fact that the downward trend of the biomass applies to the 4Sw sub-area only. They therefore agree that the fishing effort is too concentrated in this sub-area. On the other hand, the absence of recruitment as well as catches dominated by fish aged 10 years and older affects the entire area.
- Given that the current catch level in this sub-area may lead to a local depletion, dispersion of the fishing effort along the coast is recommended in order to reduce exploitation in 4Sw.
- Moreover, if measures are not implemented to reduce fishing effort in 4Sw, it is agreed that the TAC should be reduced for the 4S area.

The wording of the **recommendation** clearly reflects the consensus among the participants. It reads as follows:

Given the lack of significant recruitment of older fish in catches and the drop in the 4Sw biomass index, the current 4Sw catch level may lead to a local depletion of resources. The fishing effort should be more dispersed all along the coast and less concentrated in 4Sw.

Given the total 4S biomass index, the TAC of 4,000t should not be increased. If measures are not implemented to reduce fishing effort in 4Sw, the TAC should be reduced.

Finally, the excellent work done by the new biologist in charge of the 4S herring stock review, Ms. Kim Émond, and her team is acknowledged. The Chair thanked the participants and adjourned the meeting.

APPENDIX 1- LIST OF PARTICIPANTS

Name	Affiliation
Belley, Rénald	DFO Science
Boudreau, Mélanie	DFO Science
Bourdages, Hugo	DFO Science
Brassard, Claude	DFO Science
Brosset, Pablo	DFO Science
Bruneau, Benoît	DFO Science
Castonguay, Martin	DFO Science
Cerqueira, Andy	MAPAQ
Chouinard, Pierre-Marc	DFO Science
Couillard, Catherine	DFO Science
Coulombe, Francis	MERINOV-Gaspé
Cyr, Charley	DFO Science
Doniol-Valcroze, Thomas	DFO Science
Dubé, Sonia	DFO Science
Duplisea, Daniel	DFO Science
Émond, Kim	DFO Science
Girard, Linda	DFO Science
Hurtubise, Sylvain	DFO Science
Légaré, Benoît	DFO Science
Mbaye Baye Cheikh	DFO Science
Morneau, Renée	DFO Science
McQuinn, Ian	DFO Science
Nadeau, Paul (tél.)	RAPBCN
Nilo, Pedro	DFO Science
Paquet, Frédéric	DFO Science
Perrin, Geneviève	DFO Science
Plourde, Stéphane	DFO Science
Rivière, Antoine	DFO Fisheries management
Von Beveren, Elisabeth	DFO Science

APPENDIX 2- TERMS OF REFERENCE

Assessment of the Quebec North Shore (4S) herring stocks in 2016

Regional Peer Review - Quebec Region

April 12, 2017
Mont-Joli, QC

Chairperson: Charley Cyr

Context

Since 1992, the Quebec North Shore (NAFO Division 4S) herring stocks are managed using a preventive Total Allowable Catch (TAC) of 4,000 t due to the lack of scientific information to establish a formal TAC. The TAC is totally allocated to the different fishing fleets and to all catches, irrespective of the spawning stock. Between 1984 and 2010, herring landings averaged 476 t per year. Since 2011, catches have significantly increased, reaching or exceeding the TAC.

A first series of acoustic surveys was conducted in 2009, 2010, 2011 and 2013 on the Lower North Shore of Quebec (unit area 4Sw). A second series of surveys covering the whole 4S zone was initiated in 2016. When this series will be long enough, it will allow the use of an analytical assessment of the two spawning groups of the Quebec North Shore herring stocks and the establishment of limit reference points that would make it possible to develop a strategic framework for fisheries consistent with the precautionary approach.

The last assessment of the two herring spawning stocks in 4S dates back to 2011. An update of the stock status was produced in 2015. The Fisheries and Aquaculture Management Branch has requested a scientific advice on these stocks for the 2017 and 2018 fishing seasons.

Objectives

Provide a scientific advice of the spring and fall spawning herring stocks in NAFO Division 4S (Quebec North Shore) for the 2017 and 2018 fishing seasons. This advice shall include:

- An evaluation of the status of the herring stocks, based on:
  - commercial fishery statistics following the 2015 and 2016 seasons (overall distribution of landings, breakdown by unit area, month and fishing gear);
  - an update of the main biological indicators (age structure, maturity, condition, etc...) from sampling commercial data;
  - sentinel catches and index of dispersion calculated from the Teleost catches;
  - results of the 4Sw unit area acoustic surveys in 2009, 2010, 2011, 2013 and the whole 4S zone in 2016.
- The determination of the process to provide advice during the interim years, including a description of conditions that may warrant a full stock assessment earlier than originally planned;
- The identification and prioritization of research projects to be considered for the future.
- Perspectives and/or recommendations for 2017 and 2018 based on available data.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Document

Participation

- Fisheries and Oceans Canada (Science and Fisheries Management sectors)
- Fishing industry
- Provincial representatives
- Aboriginal communities/organizations
- External expert
- Academia
- Environmental non-governmental organizations